



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appellants: Leslie M. Brooks and Kevin L. Farley
Application No.: 09/774,545 Group Art Unit: 2151
Filed: January 31, 2001 Examiner: Hassan A. Phillips
Confirmation No.: 3228
For: ADAPTIVE COMPRESSION IN AN EDGE ROUTER

CERTIFICATE OF MAILING

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APPEAL BRIEF

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Sir:

This Appeal Brief is submitted pursuant to the Notice of Appeal received in the U.S. Patent and Trademark Office on April 11, 2006, and in support of the appeal from the Final Rejection set forth in the Office Action mailed on January 9, 2006. The fee for filing a brief in support of an appeal is enclosed.

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I. REAL PARTY IN INTEREST

The real party in interest is IPR Licensing, Inc., 300 Delaware Avenue, Suite 527, Wilmington, Delaware 19801. On information and belief:

- a) IPR Licensing, Inc. was assigned the entire right, title and interest in the subject application by virtue of an Assignment from InterDigital Patent Corporation, 300 Delaware Avenue, Suite 527, Wilmington, Delaware 19801 recorded on March 10, 2004 at Reel 014420, Frames 0435-0447;
- b) InterDigital Patent Corporation was assigned the entire right, title and interest in the subject application by virtue of an Assignment from InterDigital Acquisition Corp., 300 Delaware Avenue, Suite 527, Wilmington, Delaware 19801 recorded on February 26, 2004 at Reel 015000, Frames 0577-0584;
- c) InterDigital Acquisition Corp. was assigned the entire right, title and interest in the subject application by virtue of an Assignment from Tantivy Communications, Inc., 1450 S Babcock Street, Melbourne, Florida 32901 recorded on February 26, 2004 at Reel 015000, Frames 0141-0152; and
- d) Tantivy Communications, Inc. was assigned the entire right, title and interest in the subject application by virtue of an Assignment from the inventors recorded on May 18, 2001 at Reel 011827, Frames 0243-0246.

As the attached report (Exhibit A) from the U.S. Patent and Trademark Office's Patent Application Information and Retrieval (PAIR) system, there may be other interests, such as security interests, that may or may not have been released.

II. RELATED APPEALS AND INTERFERENCES

Appellants, the undersigned Attorney, and Assignee are not aware of any related appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1-31 remain in the application. Claims 1-31 are being appealed by way of this Appeal Brief. A copy of the claims appears in the Claims Appendix, Section VIII, of this Appeal Brief. Claims 1, 13, 25, 28, and 29 were amended in the Amendment filed on August 4, 2004. Claims 1, 13, 25, and 28 were amended in the Amendment filed on February 10, 2005. Claims 1, 25, and 28 were amended in the Amendment filed on October 19, 2005.

IV. STATUS OF AMENDMENTS

No Amendments have been filed subsequent to the Final Rejection. However, Appellants conducted a telephone interview with Examiner Phillips on March 6, 2006. During the interview, Appellants' counsel discussed in detail why the present invention is different from the cited references and that there is no teaching or suggestion of the claimed invention. Specifically, Appellants' counsel discussed a limitation of claim 1 ("enable or disable a compression process adapted to compress protocol data units in an adaptive manner"), and other pending independent claims, that is neither taught nor suggested in the cited references. Examiner Phillips respectfully disagreed in an Advisory Action mailed on March 13, 2006.

In addition to the telephone interview, Appellants submitted a Pre-Appeal Brief Request for Review on April 11, 2006. A Pre-Appeal Brief conference was conducted and the panel respectfully disagreed in a Notice of Panel Decision from Pre-Appeal Brief Review mailed on May 30, 2006.

V. SUMMARY OF CLAIMED SUBJECT MATTER

A. Claim 1

A method of the present invention provides a data communication network supporting data compression. Compression efficiency is optimized by filtering protocol-specific header and control information of a protocol data unit (PDU) to determine

compressibility of the contents of the protocol data unit. Based on the result of the filtering, the state of data link compression is selected for the protocol data unit in a manner optimizing compression efficiency.

A filter performing the filtering may access a table having entries with specific media types deemed compression limited and associate individual PDUs to a specific media type. When associating the individual PDUs, the filter typically determines if a given PDU is associated with a previously filtered PDU and, if so, assigns the same state of data link compression for the given PDU as for the previously filtered PDU. To determine whether the given PDU is associated with the previously filtered PDU, the filter may access a table including information of previously filtered PDUs.¹

The protocol data unit (PDU) contains data that is generally compressible. A protocol filter sets a state variable to "enable," which enables a compressor to compress the data in the PDU. If the PDU contains data that is not generally compressible, the protocol filter sets the state variable to "disable," which disables the compressor from attempting to compress the PDU.²

B. Claim 13

An apparatus of the present invention provides a data communication network supporting data compression. Compression efficiency is optimized by filtering protocol-specific header and control information of a protocol data unit (PDU) to determine compressibility of the contents of the protocol data unit. Based on the result of the filtering, the state of data link compression is selected for the protocol data unit in a manner optimizing compression efficiency.

A filter performing the filtering may access a table having entries with specific media types deemed compression limited and associate individual PDUs to a specific media type. When associating the individual PDUs, the filter typically determines if a given PDU is associated with a previously filtered PDU and, if so, assigns the same state

¹ See Specification, page 3, lines 6-20.

² See Specification, page 13, lines 6-10.

of data link compression for the given PDU as for the previously filtered PDU. To determine whether the given PDU is associated with a previously filtered PDU, the filter may access a table including information of previously filtered PDUs.³

The protocol data unit (PDU) contains data that is generally compressible. A protocol filter sets a state variable to “enable,” which enables a compressor to compress the data in the PDU. If the PDU contains data that is not generally compressible, the protocol filter sets the state variable to “disable,” which disables the compressor from attempting to compress the PDU.⁴

C. Claim 25

A computer-readable medium of the present invention provides a data communication network supporting data compression. Compression efficiency is optimized by filtering protocol-specific header and control information of a protocol data unit (PDU) to determine compressibility of the contents of the protocol data unit. Based on the result of the filtering, the state of data link compression is selected for the protocol data unit in a manner optimizing compression efficiency.

A filter performing the filtering may access a table having entries with specific media types deemed compression limited and associate individual PDUs to a specific media type. When associating the individual PDUs, the filter typically determines if a given PDU is associated with a previously filtered PDU and, if so, assigns the same state of data link compression for the given PDU as for the previously filtered PDU. To determine whether the given PDU is associated with a previously filtered PDU, the filter may access a table including information of previously filtered PDUs.⁵

The protocol data unit (PDU) contains data that is generally compressible. A protocol filter sets a state variable to “enable,” which enables a compressor to compress the data in the PDU. If the PDU contains data that is not generally compressible, the

³ See Specification, page 3, lines 6-20.

⁴ See Specification, page 13, lines 6-10.

⁵ See Specification, page 3, lines 6-20.

protocol filter sets the state variable to “disable,” which disables the compressor from attempting to compress the PDU.⁶

D. Claim 28

An apparatus of the present invention provides a data communication network supporting data compression. Compression efficiency is optimized by filtering protocol-specific header and control information of a protocol data unit (PDU) to determine compressibility of the contents of the protocol data unit. Based on the result of the filtering, the state of data link compression is selected for the protocol data unit in a manner optimizing compression efficiency.

A filter performing the filtering may access a table having entries with specific media types deemed compression limited and associate individual PDUs to a specific media type. When associating the individual PDUs, the filter typically determines if a given PDU is associated with a previously filtered PDU and, if so, assigns the same state of data link compression for the given PDU as for the previously filtered PDU. To determine whether the given PDU is associated with a previously filtered PDU, the filter may access a table including information of previously filtered PDUs.⁷

The protocol data unit (PDU) contains data that is generally compressible. A protocol filter sets a state variable to “enable,” which enables a compressor to compress the data in the PDU. If the PDU contains data that is not generally compressible, the protocol filter sets the state variable to “disable,” which disables the compressor from attempting to compress the PDU.⁸

E. Claim 29

The adaptive compression enables a subordinate protocol layer to be aware of the compressibility of the protocol data units (PDUs) of the higher protocol layer it carries.

⁶See Specification, page 13, lines 6-10.

⁷ See Specification, page 3, lines 6-20.

⁸See Specification, page 13, lines 6-10.

So, without changes to the higher protocol layer or the compression algorithm of the subordinate layer, the subordinate protocol layer improves efficiency of its compression, thereby enabling greater throughput on the connection to which the adaptive compression is applied.⁹

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

As a concise statement of the grounds for appeal, Appellants state that Claims 1-31 stand rejected under 35 U.S.C. 103(a) in the present Final Office Action mailed on January 9, 2006, with the Examiner finding the claims to be unpatentable over Gillon et al. (U.S. Patent No. 5,838,927) hereinafter “Gillon” in view of Christensen et al. (U.S. Patent No. 5,555,377) hereinafter “Christensen.”

VII. ARGUMENT

Group I: Claims 1-31

The claims in Group I stand or fall together.

A. The Rejection

Claims 1-31 stand rejected under 35 U.S.C. §103(a), with the Examiner finding the claims to be unpatentable over Gillon in view of Christensen.

B. The Gillon Patent

Gillon provides a system having a continuously running compression stream. The continuously running compression stream receives data when a compression unit, in communication with the continuously running compression stream, detects a data packet with a content header indicating that data is compressible.¹⁰ As illustrated in FIG. 4B of Gillon, compression occurs continuously, and not simply at times t1, t2, t3 and t4. That is, data begins compressing at time t0 as soon as the compression unit determines that the data is compressible. Data continues to be compressed at and between times t0, t1, t2, t3,

⁹ See Specification, page 7, lines 4-10.

¹⁰ See Gillon, Col. 5, lines 52-56.

and t4. By continuously running the compression stream, Gillon is able to avoid inherent latency in data transmission.¹¹

C. The Christensen Patent

Christensen provides a system that enables compression based on a predetermined threshold of network activity.¹² Once the predetermined threshold of network activity has been exceeded, an interrupt is sent to a protocol stack.¹³ The protocol stack then enables compression as a result of the increased network activity. In this way, Christensen enables compression based on network activity.¹⁴

D. Claims 1-31 are Non-obvious

Appellants respectfully submit that a combination of Gillon and Christensen does not meet basic requirements of *prima facie* case of obviousness for claims 1-31. To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.¹⁵

MPEP 2143.01 sets forth multiple tests regarding suggestion or motivation to modify references, including: (a) the prior art must suggest the desirability of the claimed invention, (b) where the teachings of the prior art conflict, the examiner must weigh the suggestive power of each reference, (c) fact that references can be combined or modified is not sufficient to establish *prima facie* obviousness, (d) fact that the claimed invention is

¹¹ See Gillon, Col. 6, lines 26-37.

¹² See Christensen, Col. 4, lines 52-54.

¹³ See Christensen, Col. 4, lines 52-60.

¹⁴ See Christensen, Col. 5, lines 29-33.

¹⁵ See MPEP 2143.

within the capabilities of one of ordinary skill in the art is not sufficient by itself to establish *prima facie* obviousness, (e) the proposed modification cannot render the prior art unsatisfactory for its intended purpose, and (f) the proposed modification cannot change the principle of operation of a reference.¹⁶ The letters (a)-(f) associated with the tests are not found in MPEP 2143.01, but they are used herein for reference purposes. Each of the lettered reasons will be addressed in turn below.

With regard to test (a) (“prior art must suggest the desirability of the claimed invention”), neither Gillon nor Christensen suggests the desirability for optimizing data compression by enabling or disabling a compression process. Gillon teaches away from such a technique, evidenced by disclosure of a continuous compression process¹⁷, and Christensen enables/disables compression as a result of exceeding a threshold of network activity (i.e., Christensen’s enabling/disabling does not optimize compression); instead, enabling compression occurs only when network activity is high and compression would relieve roadblocks to communication.¹⁸ Thus, neither reference alone or in combination, suggests desirability for optimizing data compression by enabling or disabling a compression process.

With regard to test (b) (“where the teachings of the prior art conflict, the examiner must weigh the suggestive power of each reference”), Gillon’s continuously running compression process conflicts with Christensen’s compression process, which can be enabled and disabled. Therefore, the suggestive power of each reference must be weighed. Since Christensen is only being used to show that, “‘selectively controlling a state of a compression algorithm’ was known at the time of the invention,” as stated in part 20 of the present Final Office Action on page 8, Appellants respectfully submit that Gillon’s continuously running compression process weighs more heavily. Thus, for reasons presented above with respect to the term “continuous,” the combination of Gillon and Christensen fails test (b).

¹⁶See MPEP, 2143.01.

¹⁷ See Gillon, Col. 6, lines 26-37.

¹⁸ See Christensen, Col. 4, lines 52-54; col. 2, lines 16-18.

With regard to test (c) (“fact that references can be combined or modified is not sufficient to establish *prima facie* obviousness”), Appellants submit that this is the case in terms of combining Gillon and Christensen; therefore, test (c) fails.

With regard to test (d) (“fact that the claimed invention is within the capabilities of one of ordinary skill in the art is not sufficient by itself to establish *prima facie* obviousness”), Appellants again respectfully submit that this is the case in terms of combining Gillon and Christensen; therefore, test (d) fails.

With regard to test (e) (“the proposed modification cannot render the prior art unsatisfactory for its intended purpose”) and test (f) (“the proposed modification cannot change the principle of operation of a reference”), Appellants respectfully submit the following.

Combining the enabling and disabling compression process disclosed by Christensen¹⁹ and the continuously running compression stream of Gillon changes the basic operation of the system disclosed by Gillon. Such a combination would also cause the Gillon system to fail for its particular purpose, as it would add inherent latency in data transmission. Moreover, such a combination would require modification of the Gillon system beyond simply replacing its compression process with a compression process that can be enabled and disabled. In particular, (i) Gillon’s continuously running compression stream would have to be modified to be discontinuous to account for non-compressible protocol data packets being added to the compression stream of Fig. 4B of Gillon (change in basic operation), (ii) Gillon discloses that only compressible protocol data packets are added to the compression stream (change in basic operation)²⁰, (iii) allowing the Gillon continuous compression process to be enabled and disabled would add inherent latency to the data transmission (failure for its particular purpose), and (iv) a process that associates states of compression would have to be added to the Gillon system in addition to the Christensen enabled/disabled compressor (modification).

Therefore, Appellants respectfully submit that tests (e) and (f) fail.

¹⁹See Christensen, Figure 5.

²⁰See Gillon, Col. 5, lines 52-56.

Because MPEP 2143.01, tests (a)-(f) as presented above, fail, Appellants respectfully submit that the combination of Gillon and Christensen fails to achieve the basic requirements of a *prima facie* case of obviousness. Accordingly, Appellants respectfully submit that the rejection of claim 1 under 35 U.S.C. 103(a) should be withdrawn.

Independent claims 13, 25, 28, and 29 of Group I include similar limitations as claim 1 and should be allowable for similar reasons as described above.

Appellants respectfully submit that all the remaining claims in the application are in condition for allowance based on their dependency on independent claims 1, 13, 25, 28, and 29.

In view of the foregoing, Appellants respectfully request the Board to rule in favor of a withdrawal of the rejection of Claims 1-31 (Group I) under 35 U.S.C. § 103(a) and recommend the application be allowed to pass to issue.

Respectfully submitted,

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VIII. CLAIMS APPENDIX

1. In a data communication network supporting data compression, a method for optimizing compression efficiency, comprising:
 - filtering protocol-specific header and control information of a protocol data unit (PDU) to determine compressibility of the contents of said protocol data unit;
 - based on the result of said filtering, selecting a state of data link compression for said protocol data unit to optimize compression efficiency; and
 - associating the selected state of data link compression with the protocol data unit to enable or disable a compression process adapted to compress protocol data units in an adaptive manner.
2. The method as claimed in Claim 1, further including compressing the contents of the protocol data unit as a function of the state of data link compression.
3. The method as claimed in Claim 2, wherein compressing the contents of the protocol data unit includes applying an indication in or with the compressed protocol data unit to indicate whether the contents of the protocol data unit have been compressed.
4. The method as claimed in Claim 3, further including decompressing the compressed contents of the protocol data unit.
5. The method as claimed in Claim 4, wherein, based on the indication of whether the contents of the protocol data unit have been compressed, decompressing the compressed contents of the protocol data unit is performed in a manner previously negotiated.
6. The method as claimed in Claim 1, further including accessing a table having entries with specific media types deemed compression limited.
7. The method as claimed in Claim 1, wherein filtering includes associating individual protocol data units to a specific media type.

8. The method as claimed in Claim 7, wherein associating includes determining if a given protocol data unit is associated with a previously filtered protocol data unit and, if so, assigning the same state of data link compression for the given protocol data unit as for the previously filtered protocol data unit.
9. The method as claimed in Claim 8, wherein determining includes accessing a table including information of previously filtered protocol data units.
10. The method as claimed in Claim 1, wherein selecting the state of the data link compression includes disabling the data link compression if the compressibility of the contents of the protocol data unit is determined to be low.
11. The method as claimed in Claim 1, wherein selecting the state of the data link compression includes enabling the data link compression if the compressibility of the contents of the protocol data unit is determined to be high.
12. The method as claimed in Claim 1, further including initializing a table used by the data link compression with data patterns expected to be contained in the content of said protocol data unit.
13. In a data communication network supporting data compression, an apparatus for optimizing compression efficiency, comprising:
 - a filter of protocol-specific header and control information of a protocol data unit (PDU) to determine compressibility of the contents of said protocol data unit; and
 - a selector coupled to the output of the filter to (i) select a state of data link compression for the protocol data unit to optimize compression efficiency and (ii) to associate the selected state of data link compression with the protocol data unit to enable or disable a compressor adapted to compress protocol data units in an adaptive manner.

14. The apparatus as claimed in Claim 13, further including a compressor responsive to the state of data link compression to compress the contents of the protocol data unit.
15. The apparatus as claimed in Claim 14, wherein the compressor includes an indication in or with the compressed protocol data unit to indicate whether the contents of the protocol data unit have been compressed.
16. The apparatus as claimed in Claim 15, further including a decompressor to decompress the compressed contents of the protocol data unit.
17. The apparatus as claimed in Claim 16, wherein, based on the indication of whether the contents of the protocol data unit have been compressed, the decompressor decompresses the contents of the protocol data unit in a manner previously negotiated with the compressor.
18. The apparatus according to Claim 13, wherein the selector includes a table having entries with specific media types deemed compression limited.
19. The apparatus as claimed in Claim 13, wherein the filter further associates individual protocol data units to a specific media type.
20. The apparatus as claimed in Claim 19, wherein the filter further includes a tracking unit to determine if a given protocol data unit is associated with a previously filtered protocol data unit and, if so, assigns the same state of data link compression for the given protocol data unit as for the previously filtered protocol data unit.
21. The apparatus as claimed in Claim 20, wherein the filter further includes a table having information of previously filtered protocol data units.

22. The apparatus as claimed in Claim 13, wherein the selector disables the data link compression if the compressibility of the contents of the protocol data unit is determined to be low.
23. The apparatus as claimed in Claim 13, wherein the selector enables the data link compression if the compressibility of the contents of the protocol data unit is determined to be high.
24. The apparatus as claimed in Claim 13, further including an initialization unit to initialize a table used by the data link compression with data patterns expected to be contained in the content of said protocol data unit.
25. In a data communication network supporting data compression, an apparatus for optimizing compression efficiency, comprising:
 - means for filtering protocol-specific header and control information of a protocol data unit to determine compressibility of the contents of said protocol data units;
 - based on the results of said filtering, means for selecting a state of data link compression for said protocol data unit to optimize compression efficiency; and
 - means for associating the selected state of data link compression with the protocol data unit to enable or disable a compression process adapted to compress protocol data units in an adaptive manner.
26. The apparatus as claimed in Claim 25, further including means for compressing the contents of the protocol data unit based on the state of data link compression.
27. The apparatus as claimed in Claim 26, further including means for decompressing the contents of the protocol data unit in a manner previously negotiated with the compressor.
28. A computer-readable medium having stored thereon sequences of instructions, the sequences of instructions including instructions, when executed by a processor, causes the processor to perform:

filtering protocol-specific header and control information of a protocol data unit to determine compressibility of the contents of said protocol data unit;

based on the results of said filtering, selecting a state of data link compression for said protocol data unit to optimize compression efficiency; and

associating the selected state of data link compression with the protocol data unit to enable or disable a compression process adapted to compress protocol data units in an adaptive manner.

29. In a data communication network supporting data compression, a method for optimizing compression efficiency, comprising:

without changes to a subordinate protocol layer or changes to the higher protocol layers it carries, selectively controlling a state of a compression algorithm based on a protocol-specific header and control information of a protocol data unit to determine compressibility for compressing data transported by protocol data units across a connection in the data communication network to optimize the compression efficiency.

30. The method as claimed in Claim 29, wherein selectively controlling the state of the compression algorithm enables or disables the compression algorithm.

31. The method as claimed in Claim 29, wherein selectively controlling the state of the compression algorithm includes analyzing protocol-specific header and control information of the protocol data units of the higher protocol layers.

IX.

EVIDENCE APPENDIX

NONE

X.

RELATED PROCEEDINGS APPENDIX

NONE

**Patent Assignment Abstract of Title**

Total Assignments: 10

Application #: 09774545 **Filing Dt:** 01/31/2001 **Patent #:** NONE **Issue Dt:**
PCT #: NONE **Publication #:** US20020103938 **Pub Dt:** 08/01/2002

Inventors: Leslie M. Brooks, Kevin L. Farley
Title: Adaptive compression in an edge router

Assignment: 1

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Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

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Reel/Frame: 012506 / 0808 **Received:** 02/06/2002 **Recorded:** 01/22/2002 **Mailed:** 03/25/2002 **Pages:** 11

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Conveyance: SECURITY AGREEMENT

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Conveyance: RELEASE

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Assignment: 6

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Conveyance: SECURITY INTEREST (SEE DOCUMENT FOR DETAILS).

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Assignment: 7

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Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

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Assignment: 8

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Assignment: 10

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Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

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